

**CONSTRUCTION OF  
SIXTH STREET WATERLINE EXTENSION – GRAND BOULEVARD TO  
RIMPAU AVENUE**

**PROJECT NO. 2018-03, NIB 19-019CA**

**SPECIAL PROVISIONS**

**SECTION W – WATER**

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction 2015 Edition (Greenbook). These Special Provisions have been arranged into a format that parallels the Greenbook.

Bidders with pre-bid inquiries regarding the Work covered in this Section should be directed to Carol Appelt [Carolyn.Appelt@coronaca.gov](mailto:Carolyn.Appelt@coronaca.gov) or at (951) 279-3620.

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SECTION W – WATER

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## SECTION 2 - SCOPE AND CONTROL OF WORK

### 2-5 PLANS AND SPECIFICATIONS.

#### 2-5.3.3 Shop Drawings.

Add the following to Table 2-5.3.3:

**TABLE 2-5.3.3**

Item	Subsection No.	Title	Subject
7	212-1.1	Submittal Package	Water and Sewer System Valves and Appurtenances
8	306-8.9.4	Disinfection	Disinfection, Testing, Flushing, and Dechlorinating, Discharge to Sewer or Storm Drain, Laboratory Testing

## SECTION 4 - SCOPE AND CONTROL OF WORK

Add the following subsection:

#### 4-1.1.1 Buy-American Clause.

Unless otherwise shown, all materials used for water system construction shall be made in the United States of America.

Add the following section:

## SECTION - 10 AGENCY STANDARD DRAWINGS

### 10-1. STANDARD WATER AND WASTEWATER CONSTRUCTION DRAWINGS.

Agency standard drawings governing construction in the City of Corona include the following:

Standard 301	Sewer Lateral on New Sewer
Standard 302	Standard Manhole
Standard 303	Drop Manhole
Standard 304	Sewer Lateral Connection on Existing Sewer
Standard 305	Not Used
Standard 306	Not Used
Standard 307	Sewer Lateral Terminal Cleanout
Standard 308	Sewer Pipe Bedding and Trench Details
Standard 309	Steel Casing for Gravity Flow Pipe
Standard 310	Concrete Slope Anchors
Standard 401	Concrete Thrust Blocks Details
Standard 402	Steel Casing for Pressure Pipe
Standard 403	Not Used
Standard 404	Potable Water Sample Station
Standard 405	Guard Post Details
Standard 406	Potable and Reclaimed Water Pipe Bedding and Trench Details
Standard 407	Potable Water Line Crossing Under Existing Utility

Standard 407R	Reclaimed Water Line Crossing Under Existing Utility
Standard 408	1" Potable Water Service Connection Detail with Fire Sprinkler Service
Standard 409	1½" and 2" Potable Water Service Connection Detail with Fire Sprinkler Service
Standard 410	Pressure Regulating Station
Standard 411R	Reclaimed Water Irrigation Sign
Standard 412	6" Potable Water Fire Hydrant Installation
Standard 412R	6" Reclaimed Water Fire Hydrant Installation
Standard 413	1" or 2" Potable Water Combination Air and Vacuum Release
Standard 413R	1" or 2" Reclaimed Water Combination Air and Vacuum Release
Standard 414	1" Potable Water Service Connection Detail without Fire Sprinkler Service
Standard 414R	1" Reclaimed Water Service Connection Detail
Standard 415	1½" and 2" Potable Water Service Connection Detail without Fire Sprinkler Service
Standard 415R	1½" and 2" Reclaimed Water Service Connection Detail
Standard 416	6" Potable Water Fire Hydrant Blow-Off Assembly
Standard 416R	6" Reclaimed Water Fire Hydrant Blow-Off Assembly
Standard 417	Double Check Detector Assembly
Standard 418	Adjustable Pipe Support
Standard 419	Pipeline Separation Requirements
Standard 420	Resilient Wedge Gate Valve Installation
Standard 421	Cut-in Tee
Standard 422	Valve Box and Valve Stem Extension
Standard 423	Not Used
Standard 424	Meter Room Potable Water Service Connection Detail
Standard 425	Courtyard Potable Water Service Connection Detail
Standard 426	Potable Water Compound Flow Meter
Standard 426R	Reclaimed Water Compound Flow Meter
Standard 427	Not Used
Standard 428	Reduced Pressure Principle Backflow Assembly
Standard 450	Two Wire Test Station
Standard 451	Not Used
Standard 452	Casing Test Station
Standard 453	Insulator Test Station
Standard 454	Test Station Box and Wiring
Standard 455	Test Station Locations in Street Right-of-Way
Standard 456	Alumino-Thermic (CAD) Welding and Pin Brazing
Standard 457	Bonding for Pipe Joints and Fittings
Standard 458	Insulating Joint

## **SECTION 209 – PRESSURE PIPE**

### **209-1.1.1 General**

*Delete entire subsection and substitute with the following:*

### **209-1.1.1 General**

This subsection specifies ductile iron pipe used for pressure piping applications for water and reclaimed water pressure pipes, sewage force mains, and other liquids. Pipe shall be fully

self-restrained without the use of thrust blocks, notwithstanding the requirement for supplemental thrust blocks in City of Corona Standard Drawing 401.

PVC, HDPE, CML&C steel, asbestos cement, or concrete cylinder pipe (CCP) pressure pipe shall not be used in the City of Corona without written approval from the Engineer. Acceptable manufacturers are listed in Table 209-1.1.1:

**TABLE 209-1.1.1**

Item	Manufacturer
Ductile-Iron Pipe	American Cast Iron Pipe Company (ACIPCO)
	Clow Water Systems Company
	Griffin Pipe Products
	Pacific States Cast Iron Pipe Co Div. McWane, Inc.
	U.S. Pipe and Foundry
Ductile-Iron Pipe Fittings	American Cast Iron Pipe
	Clow Water Systems Company
	Griffin Pipe Products
	Star Pipe Products
	Tyler Union Div. McWane, Inc.
	U.S. Pipe and Foundry
Push-on Joints	American Cast Iron Pipe "Fastite"
	Clow Water Systems Company
	Griffin Pipe Products
	Pacific States Cast Iron Pipe Co Div. McWane, Inc.
	U.S. Pipe and Foundry "Tyton"
Restrained Joints – Locking Gasket Type	American Cast Iron Pipe "Fast-Grip"
	Griffin Pipe Products "Talon"
	Pacific States Cast Iron Pipe Co Div. McWane, Inc. "Sure-Stop"
	U.S. Pipe and Foundry "Field-Lok"
Tee-Head Bolts and Hex Nuts on Mechanical Joints	NSS Industries Corten
	Tripac
Restrained Joints - Third-Party Follower-Gland-Type Mechanical Joint Restraints for Ductile Iron Pipe	EBAA Iron Megalug Series 1100
	#1100 for new MJ fittings 3"-48"
	#1100SD restraint for existing MJ fittings 3"-48"
	Ford Uni-Flange Series 1300 Restrained End Cap for MJ fittings 4"-16"
Third-Party Follower-Gland-Type Mechanical Joint Restraints for Joining to Existing PVC Pipe	Ford Uni-Flange Series 1400 for MJ fittings 4"-36"
	EBAA Iron Megalug Series 2000
	#2000PV for new MJ fittings 4"-24"
Third-Party Transition Coupling for Joining DI Pipe to AC Pipe	#2000SV for existing MJ fittings 4"-24"
	Ford Uni-Flange Series 1500 Circle Lock for MJ fittings 4"-24"
	Romac 501-13.55 x 14 (L) or 501-13.55 x 14.44 x 14 (L) if required. Transition Coupling
Third-Party Ductile Iron Pipe Restraint Harness for Push-on Bells (For DIP only. Do not use on PVC)	Accepted Equals
	EBAA Iron Megalug Series 1700 Restraint Harness 3"-36"
	Ford Uni-Flange Series 1450
Flanged Coupling Adaptor Restraints	EBBA Iron Megaflange Series 2100 3"-48"
	Ford Meter Box Company, Uni-flange w/ UFR 1400 3"-24"

	JCM Industries, Inc. Style 301 Romac Industries RFCA Smith Blair, Inc Style 912, "Flange Lock" DIP 3"-12"
Shop Coat on Buried Pipe	Koppers 11-S Primer
Polyethylene Encasement	Christy's "AWWA Polywrap" Dupont Alathon Northtown Company Trumbull Industries, Inc. Accepted Equal
Ceramic Epoxy Lining	Induron Protecto 401
Field Coatings on Buried Pipe	Koppers Bituplastic No 33

**209-1.1.2 Materials.**

Add the following to Table 209-1.1.2:

**TABLE 209-1.1.2**

Item	Material	Specification	
Pipe	Minimum Wall Thickness	Pipe with Threaded Flanges	Thickness Class 53
Interior Lining and Exterior Coating	Ceramic Epoxy Interior Lining, where shown on Plans – required for pipes transporting sewage	Minimum 20% by volume ceramic quartz pigment.	
Joints	Restrained Style (Required on all new pipe construction)	Locking gasket style	
Fittings	Style	Mechanical joint (with restraint) or flanged	
Ductile Iron Pipe Joint Restraints	Style	Locking gasket style	

**209-1.1.2 Materials.**

Delete the following from Table 209-1.1.2:

**TABLE 209-1.1.2**

Item	Material	Specification
Fittings	Style	Push-on (standard) or restrained joint (as shown).
Alternate to Polyethylene Encasement	Pipe Finish Coat	15 mils (375 µm) MDFT field-applied bitumastic coating

**SECTION 212 – WATER AND SEWER SYSTEM VALVES AND APPURTENANCES****212-2 FLANGED AND THREADED CONNECTIONS.**

**212-2.5 Flange, Coupling, and Harness Bolts, Nuts, and Washers.***Add the following:*

Acceptable manufacturers are listed in Table 212-2.5.

**TABLE 212-2.5**

<b>Item</b>	<b>Manufacturer</b>
Anti-Seize Compound for Stainless Steel Bolts and Nuts	Bostik Never Seez
	Christy's Antiseize
	Husk-It Husky Lube O-Seal
	Loctite
	Permatex
	Ramco Antiseize
	Ramco TRX-Synlube
Bolts and Nuts	Industrial Threaded Products, Inc.
	Ocean State Stainless, Inc.
	Pacific Coast Bolt
	Tripac Fasteners
	Western Pacific Products
Buried Bolt Coatings	3M Company (EC 244)
	Protecto-Wrap
	Carboline Bitumastic No. 50
	Engard Coatings 858
	Tnemec Co. (46-465 H.B. Tnemecol)

**212-2.5.2 Flange, Coupling, and Harness Bolts, Nuts, and Washers for Above-Ground Ferrous or Plastic Piping.***Delete the following from Table 212-2.5.2:***TABLE 212-2.5.2**

<b>Item</b>	<b>Material</b>	<b>Specification</b>
Bolts for Above-Ground Ferrous Installations	Zinc-Plated Carbon Steel	ASTM A307 Grade B. Heavy hexagon series ANSI B1.1 Class 2A fit Class 3A fit may be used for holes tapped for studs. 1/4" to 1/2" (6mm-12.5mm) shall project through tightened nut. Threads may be either cut or cold-formed. Threading per ANSI/ASME B18.2.1. Bolt-Head Identification Mark – "A307B"
Nuts for Above-Ground Ferrous Installations	Zinc-Plated Carbon Steel	ASTM A563. Heavy hexagon series ANSI B1.1 Class 2B fit. Threading per ANSI/ASME B18.2.2.



Coating for Existing Bolts and Nuts	Non-Oxide Grease	Use on zinc-plated carbon steel hardware
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### **212-2.5.3 Applications in Corrosive, High-Chloride, or Saltwater Environments.**

*Delete the following from Table 212-2.5.3:*

**TABLE 212-2.5.3**

<b>Item</b>	<b>Material</b>	<b>Specification</b>
Coating for Buried Nuts and Bolts	AWWA C217 Petrolatum Wax and Wax-Tape System	Primer, wax, and 40-mil (1 mm) tape per AWWA C217. 1" (25 mm) minimum tape overlap with 1.5-mil (40 µm) clear metallocene resin tape outer wrap.

### **212-2.7 Flange Gaskets.**

*Add the following:*

Acceptable manufacturers are listed in Table 212-2.7:

**TABLE 212-2.7**

<b>Item</b>	<b>Manufacturer</b>
NSF 61-Listed Flange Gaskets	Bluegard Div. Garlock, Inc. Style 98206
	PSI (Pipeline Seal and Insulator, Inc.) "Linebacker 61"
	U.S. Pipe and Foundry "Flange-Tyte"
Flange Gaskets – Cloth-Inserted	Bluegard Div. Garlock, / Inc. Style 5000
	John Crane (Cranite)
	Johns Manville 60
	Tripac Style 5000
Flange Gaskets – Neoprene	Bluegard Div. Garlock, Inc. Style 2000
	John Crane (Cranite)
	Johns Manville 60
	Tripac Style 2000

### **212-2.8.3 Flange Insulating Kits.**

*Add the following:*

Acceptable manufacturers are listed in Table 212-2.8.3.2.

**TABLE 212-2.8.3.2**

<b>Item</b>	<b>Manufacturer</b>
Flange Insulation Kit Products	APS Advance Products & Systems, Inc
	Calpico, Inc.
	Central Plastics Company
	Corrpro Corrosion Div Control Products Company

	Farwest Corrosion Control
	PSI (Pipeline Seal and Insulator, Inc.)
Insulating Reducing Bushings	Christy's
Insulating Gaskets	Calpico, Inc.
	PSI Linebacker "Type E"

### **212-2.9 Mastic and Tape-Wrap Systems.**

*Delete section in its entirety.*

### **212-4 VALVE ACTUATORS, EXTENSIONS, AND VALVE BOXES.**

#### **212-4.2.2 Valve Extension Stems.**

*Delete the following:*

Extension stems on valves shall be furnished and installed wherever the valve centerline is more than 4 feet (1.2 m) below the finish grade or water surface. The extension stem shall bring the nut to within 6 inches (150 m) below the finished grade or water surface. Stem extensions shall not be pinned to the valve operating nut.

*Replace with the following:*

Extension stems on valves shall be furnished and installed wherever the valve centerline is more than 5 feet below the finish grade or water surface. The extension stem shall bring the nut to 2 feet below the finished grade or water surface. Stem extensions shall not be pinned to the valve operating nut.

#### **212-4.2.3 Valve Can and Cover for Buried Valves.**

##### **212-4.2.3.1. General.**

*Add the following:*

Acceptable manufacturers are listed in Table 212-4.2.2.

**TABLE 212-4.2.3.1**

<b>Item</b>	<b>Manufacturer</b>
Valve Boxes and Covers	Christy's G-5
	Eisel Enterprises, Inc.
	Jensen Precast
	DFW Plastics Inc.
Valve Box Covers	Alhambra Foundry Company Ltd.
	Long Beach Iron Works, Inc.
	Neenah Foundry
	South Bay Foundry
	U S Foundry and Manufacturing Corp
	DFW Plastics Inc.

### **212-5 VALVES.**

**212-5.1.1 General.**

*Add the following:*

Acceptable manufacturers are listed in Table 212-5.1.1.

**TABLE 212-5.1.1**

<b>Item</b>	<b>Manufacturer</b>
Resilient Wedge Gate Valves (Potable Water AWWA C515)	ACIPCO American Flow Control Series 2500
	Clow Valve Series 2600
	Kennedy Valve Div., McWane, Inc. Kenseal II
	M&H Valve Div. McWane Inc Style 7000
	Mueller Co. Series 2360

**212-5.6 Air Release, Air/Vacuum, and Combination Air Valves.****212-5.6.1 General.**

*Delete entire subsection and substitute with the following:*

Air release, air/vacuum and combination air valves shall comply with AWWA C512, except where listed acceptable manufacturers include patented air release, air vacuum and combination air valves similar in function, but not design to AWWA C512. Said products shall be capable of passing all tests described in AWWA C512 Section 5.

Acceptable manufacturers are listed in Table 212-5.6.1.

**TABLE 212-5.6.1**

<b>Item</b>	<b>Manufacturer</b>
Air Release Valves (for working pressures to 175 psi)	ARI Flow Control Accessories D-040-C Series 1"- 2" D-015 Series 3"- 8"
Air Release Valves (for working pressures over 175 psi)	ARI Flow Control Accessories D-065 HF Series
Well Service Air Valves 3-inch and smaller	ARI Flow Control Accessories D-070 Series
Air and Vacuum Valves	ARI Flow Control Accessories D-040-C Series 1"- 2" S-015 Series 3"- 8"
Combination Air and Vacuum Valves	ARI Flow Control Accessories D-040-C Series 1"- 2" S-015 Series 3"- 8"
Vacuum Breaker Valve with Controlled Air Release	ARI Flow Control Accessories D-040-C Series
Air Release Valves for Wastewater	ARI Flow Control Accessories S-020
Air and Vacuum Valves for Wastewater	ARI Flow Control Accessories D-020 or D-025
Combination Air and Vacuum Valves	ARI Flow Control Accessories D-020 or D-025

for Wastewater	
Combination Air and Vacuum Valves for Wastewater (All Stainless Steel)	ARI Flow Control Accessories

Note: ARI Flow Control Accessories products are manufactured in Israel.

## 212-6 HYDRANTS

### 212-6.1 Fire Hydrants.

#### 212-6.1.1 General.

*Add the following:*

Acceptable manufacturers are listed in Table 212-6.1.1

**TABLE 212-6.1.1**

Item	Manufacturer
Wet Barrel Fire Hydrants (Residential Bronze 4" x 2½")	Clow Valve Model F2050 James Jones Company Model J3710
Wet Barrel Fire Hydrants (Residential Cast Iron 4" x 2½")	Clow Valve Model F850 James Jones Company Model J4040B
Wet Barrel Fire Hydrants (Commercial Bronze 4" x 2½" x 2½")	Clow Valve Model F2060 James Jones Company Model J3765
Wet Barrel Fire Hydrants (Commercial Cast Iron 4" x 2½" x 2½")	Clow Valve Model F860 James Jones Company Model J4060B
Wet Barrel Fire Hydrants (Commercial Bronze 4" x 4" x 2½" Double Steamer)	Clow Valve Model F2065 James Jones Company Model J3775
Wet Barrel Fire Hydrants (Commercial Cast Iron 4" x 4" x 2½" Double Steamer)	Clow Valve Model F865

#### 212-6.1.1 General.

*Delete second sentence and substitute with the following:*

Color scheme shall comply with City of Corona standards. If no such standards exist, hydrants shall be painted per Table 212-12.2.

## 212-7 BACKFLOW PREVENTION DEVICES.

**212-7.2 Double Check (DC) Valve Backflow Prevention Assemblies.***Add the following:*

Acceptable manufacturers and models are listed in the University of Southern California (USC) list of – Approved Backflow Prevention Devices available from the USC Foundation for Cross-Connection Control and Hydraulic Research. Backflow prevention assemblies must meet all lead-free requirements.

**212-7.3 Reduced-Pressure (RP) Backflow Prevention Assemblies.***Add the following:*

Acceptable manufacturers and models are listed in the University of Southern California (USC) list of – Approved Backflow Prevention Devices available from the USC Foundation for Cross-Connection Control and Hydraulic Research. Backflow prevention assemblies must meet all lead free requirements.

**212-8 COUPLINGS****212-8.1 Bolted Sleeve Type Couplings.****212.8.1.1 General.***Add the following:*

Acceptable manufacturers are listed in Table 212-8.1.1.

**TABLE 212-8.1.1**

<b>Item</b>	<b>Manufacturer</b>
Couplings – Steel Bolted Sleeve Type, for Identical Pipe Materials on each side	Dresser Piping Specialties (Style 38)
	Romac Industries (400)
	Smith Blair, Inc. (Style 411)
	Total Piping Solutions (Hymax)
Couplings – Steel Bolted Transition Sleeve Type, for Different Pipe Materials on each side	Dresser Piping Specialties (Style 162) or (Style 62TY.1)
	Romac Industries (TC400)
	Smith Blair, Inc. (Style 413)
	Total Piping Solutions (Hymax)
Couplings – Ductile Iron Bolted Sleeve Type System, for Identical or Different Pipe Materials on Each Side	Romac Industries (501) or (XR501)
	Smith Blair, Inc. (Style 461 Quantum)
Couplings – Ductile Iron Bolted Sleeve	Romac Industries (501)
	Smith Blair, Inc. (Style 462 Quantum)

Extended Range Type for Identical or Different Pipe Materials on Each Side	
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## 212-8.2 Flanged Coupling Adaptors

### 212-8.2.1. General.

Add the following:

Acceptable manufacturers are listed in Table 212-8.2.1.

**TABLE 212-8.2.1**

Item	Manufacturer
Couplings, Flanged Coupling Adaptor for Ductile Iron Pipe	Romac Industries (FCA 501)
	Smith Blair, Inc. (Style 912) 3" - 12"
	Smith Blair, Inc. (Style 913) 3" - 24"
Couplings, Flanged Coupling Adaptor (Restrained)	EBAA Iron Megaflange Series 2100 3"-24"
	Ford Meter Box Company (Restrained Flange Adaptor with UFR 1400) 3" - 24"

## 212-10 SERVICE LATERALS, METERS, AND METER BOXES

### 212-10.3 Corporation Stops, Angle Meter Valves, Service Saddles and Other Service Materials.

Add the following:

Acceptable manufacturers are listed in Table 212-10.3.

**TABLE 212-10.3**

Item	Manufacturer
Angle Meter Stop (Ball Valve)	Ford Meter Box Co. BA43-444W-NL
	James Jones E-1963WSG or E-1975WSG
	Mueller Company B-24258N or B-24276N
	A.Y. McDonald Mfg. Co. 74602BQ or 74602BCSQ
Brass Body Type 304L Stainless Steel Double-Strap Service Saddles for AC, CIP, DIP, and PVC Pipe	Ford Meter Box Co. Style 202BSD and 202BS
	Mueller Company BR2S and BR2W Series
	James Jones J-969 Series and 969W
	A.Y. McDonald Mfg. Co. 3825 and 3826
Corporation Stops	Ford Meter Box Co. FB1000-3-Q-NL, FB1000-4-Q-NL, FB1000-6-Q-NL or FB1000-7-Q-NL
	James Jones E1935SG

Customer Service Meter Valves	Mueller Company B-25028N
	A.Y. McDonald Mfg. Co. 74704BQ
	Ford Meter Box Co. Style B13-344W-NL and B13-444W-NL with “lock off” handle
	James Jones Style E-1900W with “lock off” handle
	Mueller Company B24351N or B-20200N with “lock off” handle
Meter Bolts – Silicon Bronze	A.Y McDonald Mfg. Co. 76101MW with “lock off” handle
	Tripac Fasteners
Meter Yokes	Ford Meter Box Co.
	Mueller Company. EZ Setter

**212-10.4 Meters.**

*Delete entire subsection and substitute with the following:*

Acceptable types of meters shall be as shown on the Plans or Standard Plans.

Registers shall be straight-reading type, hermetically sealed, having a register test hand. Registration shall be in gallons or cubic feet as shown in the Special Provisions. Registration accuracy shall comply with AWWA or these Special Provisions. Meters 5/8-inch through 2-inch in size shall provide remote read capabilities for remote meter reading system. Meters larger than 2-inch size shall be installed in above-ground locations. Magnetic meters shall provide local read with 4-20mA signal output where required by City.

Acceptable manufacturers are listed in Table 212-10.4.1

**TABLE 212-10.4.1**

<b>Item</b>	<b>Manufacturer</b>
Positive Displacement Flow Meters	Neptune Model T-10
Compound Flow Meters	Neptune Tru/Flow Compound
Magnetic Flow Meters	Endress + Hauser Promag 400

Meters shall conform to the following:

**TABLE 212-10.4.2**

<b>Type of Meter</b>	<b>Size Range</b>	<b>Case</b>	<b>Specification</b>
Positive Displacement Meters	5/8” through 1-1/2”	Lead Free High Copper Alloy	Accuracy to 1.5% within normal operating flow range – remote read capable
Compound Meters	2”	Lead Free High Copper Alloy	Accuracy to 1.5% within normal operating flow range – remote read capable
Compound Meters	3” through 8”	Lead Free High	Accuracy to 1.5%

		Copper Alloy	within normal operating flow range
Magnetic Meters	4" through 54"	Epoxy-Lined and Coated Steel	Accuracy to 0.5% within flow range having 20:1 minimum turndown ratio

**212-10.6 Meter Boxes.**

*Delete entire subsection and substitute with the following:*

**212-10.6.1 General.**

Meter boxes and lids in parkways and areas not subject to traffic shall be polymer. Meter boxes and lids subject to traffic shall be concrete, H-20 traffic load rated. Provide remote read lid labeled "WATER".

Acceptable manufacturers are listed in Table 212-10.6.1.

**TABLE 212-10.6.1**

Item	Manufacturer
Polymer-Concrete Meter Box for 1" Meter and Smaller without Fire Sprinkler Service	DFW Plastic Inc. DFWPW6C4-12-4F (16-5/16" x 31-3/4")
Polymer-Concrete Meter Box for 1" Meter and Smaller with Fire Sprinkler Service	DFW Plastic Inc. DFWPW6C4-12-4F (16-5/16" x 31-3/4")
Polymer-Concrete Meter Box for 1½" Meter and 2" Meter	DFW Plastic Inc. DFWPW6C4-12-4F (16-5/16" x 31-3/4")
H-20 Load Rated Concrete Meter Box for 2" Meter and Smaller	DFW Plastic Inc. DFWPW6C4-12-4F (16-5/16" x 31-3/4")

**212-10.6.2 Dimensions.**

Minimum meter box dimensions shall conform to the following:

**TABLE 212-10.6.2**

Size of Meter	Interior Length (Below Lip)	Interior Width (Below Lip)	Depth
¾" or less	25"	13"	12"
1"	25"	13"	12"
1½"	29"	16"	12"
2"	29"	16"	12"



**212-12 PAINTING, INTERIOR LINING, AND EXTERIOR COATING.****212-12.1 Lining and Coating of Ferrous Valve, Hydrant, Valve Operator, Meter, Coupling, Expansion Joint, Spool, Fitting, and Backflow Preventer Surfaces.****212-12.1.1 General.**

*Add the following:*

Acceptable manufacturers are listed in Table 212-12.1.1.

**TABLE 212-12.1.1**

<b>Item</b>	<b>Manufacturer</b>
NSF-Approved Fusion-Bonded Epoxy Linings and Coatings	3M Scotchkote 134, 206N or 6233
	Northtown Keysite 740
Fusion-Bonded Epoxy Linings and Coatings (Not NSF 61-Listed)	3M Scotchkote 134, 135, 203, 206, 206-N or 6233
	Gilpon
	Northtown Keysite 740
	Valspar "Pipe Clad" 1500 Red
Field-Applied Liquid Epoxy Linings and Coatings for Patching	3M Scotchkote 306
Field-Applied Liquid Epoxy Linings and Coatings for Patching Welded Steel Pipe	3M Scotchkote 302
NSF-Approved Liquid Epoxy Linings and Coatings	3M Scotchkote 323
	ICI Devoe - Sinclair - ICI Dulux Paint Div. Glidden Co. Bar Rust 233 series
	Tnemec Pota-Pox L140
Liquid Epoxy Linings and Coatings	3M Scotchkote 312 or 314
	ICI Devoe - Sinclair - ICI Dulux Paint Div. Glidden Co. Bar Rust 233 series
	Tnemec Pota-Pox L140
	(For nonpotable water use Tnemec Series L69)
Polyethylene Encasement for Corrosion Protection	Christy's "AWWA Polywrap"
	Dupont Alathon
	Northtown Company
	Trumbull Industries, Inc.
Tape for Polyethylene Encasement	Berry Plastics "Polyken No 900"
	Plicoflex No 340
	Protecto Wrap No 200
	Scotchwrap (3M), No 50
	Tapecoat Co., CT

## **SECTION 306 – OPEN TRENCH CONDUIT CONSTRUCTION**

### **SECTION 306-1.5.2 Permanent Resurfacing**

*Add the following after the last paragraph:*

Limits of AC overlay shall extend to edge of pavement or nearest lane line with a 2-foot minimum taper.

Disturbing more than one lane requires an overlay over the width of all lanes affected by the Work. For two-lane roadways, the requirement will be from centerline to edge of pavement overlay.

### **306-2 DELIVERY, STORAGE, HANDLING AND PROTECTION OF PIPELINE MATERIALS, FITTINGS, VALVES, AND APPURTENANCES.**

#### **306-2.2 Shipment and Delivery.**

##### **306-2.2.1 General.**

*Add the following:*

- a) Only new pipeline products of accepted manufacturers shall be delivered to or used on the site.
- b) Contractor shall not ship, accept delivery of, or store manufactured items on site for which applicable submittals have not been approved.
- c) Before shipping, the pipe, valves, motors, actuators and mechanical equipment shall be operated and tested at the factory to ensure products are complete and in working condition. Submit certified test results.
- d) Within one working day following pipe delivery, remove the pipe end covers, swab the entire pipe interior with a bleach solution, replace pipe end covers, and securely wrap the plastic and tape. Retain pipe end covers and plastic wrap covering on pipe until pipe is installed in trench.

##### **306-2.3 Storage.**

*Add the following:*

- m) No pipe or materials shall be left along right-of-way overnight.

##### **306-2.5 Protection of Pipe Interiors.**

*Delete first sentence of the second paragraph and substitute with the following:*

Cover with rubber, plastic, or canvas during shipping, storage, and staging for installation pressure pipe and clean water gravity pipe, pipe ends, fitting ends, valve ends, and equipment openings to prevent intrusion or contamination. Pipes and fittings without openings covered will not be accepted for delivery.

### **306-2.7 Shutdowns of Existing Pipelines.**

#### **306-2.7.1 General.**

*Delete entire subsection and substitute with the following:*

Work requiring the shut-down of the existing 30-inch Steel Transmission Waterline and any existing pipeline for the Contractor's benefit shall be performed by forces employed by the City of Corona or affected utility if not City-owned. Under no circumstances shall the Contractor operate valves, hydrants or other appurtenant equipment on existing public utilities.

The City, or utility owner, will make a concerted effort to isolate pressure pipelines as detailed in Appendix H. However, the Contractor shall be prepared to employ pumping and dewatering equipment if a watertight seal cannot be achieved by City or utility forces. The Agency will not be responsible for any delays or expenses due to difficulties with system shutdown and isolation.

All emergency situations shall be reported immediately to the affected utility.

#### **306-2.7.3 Temporary Bypass.**

*Delete entire subsection and substitute with the following:*

Where main shutdowns in excess of 4 hours are required, the City, or affected utility, will determine what temporary bypasses or service connections may be required. The Contractor shall furnish all necessary hose, piping, valves, water trucks, disinfection, and labor to provide and maintain temporary service. All piping, hoses and associated equipment used for temporary potable water service shall be flushed and disinfected in accordance with 306-8.9.4.

### **306-8 PREFABRICATED PRESSURE PIPE.**

#### **306-8.1 General.**

*Add the following:*

Unless otherwise shown, water pipe, fittings, and appurtenances used in the City of Corona shall be fully self-restrained ductile iron pipe. PVC pressure pipe shall not be used in the City of Corona.

Except for short runs, sections of pipe shall be installed in a sequence moving in an upgrade direction on grades exceeding 10 percent. Pipe installed in a downgrade direction shall be secured to prevent movement.

Closure and correction pieces shall be provided as required to adjust the pipe installation to conform to the pipe alignment and stationing shown.

Pipe will be inspected in the field before and after installation. Pipe which is not in true alignment or shows any undue settlement after installation shall be removed and re-installed. If any cause for rejection is discovered in a pipe after it has been installed, it shall be subject to rejection. Corrective work shall be approved by the Engineer.

#### **306-8.2 Ductile Iron Pipe**

##### **306-8.2.2.1 Push-on Joints.**

*Delete the sentence describing the use of flex-ring, split-ring, or ring segments restraint and substitute with the following:*

Push-on restrained joints shall incorporate locking gasket type restraint, and shall be installed in accordance with the manufacturer's installation and warranty instructions for the joint design used.

#### **306-8.2.2.3 Installation of Polyethylene (PE) Film Wrap on Iron Fittings.**

*Delete paragraph c) and substitute with the following:*

- c) Film wrap shall not be installed on pipe sections or fittings to be concrete encased, installed within casing, or installed through concrete slope anchors.

#### **306-8.8.2.1 General.**

*Add the following:*

Valves and appurtenances shall be constructed in accordance with the City of Corona Standard Plans.

#### **306-8.8.4 Service Connections.**

*Delete entire subsection and substitute with the following:*

Service connections shall be constructed as shown on the Plans and in accordance with the City of Corona Standard Plans. Minimum service connection size shall be 1 inch. Where mains are laid in paved streets, service connections 2 inches and smaller shall be installed by boring rather than by cutting the pavement unless prior written approval from the Engineer is obtained to avoid conflict with other utilities.

Service laterals shall be placed under curbs and gutters by boring rather than by open trenching. The letter "W" shall be inscribed in the center of the curb face in line with each meter installation. The "W" shall be approximately 1½ inches high and 1/16 inch deep. No kinks, flats, crushes or other reductions in the diameter of service laterals will be permitted.

*Add the following:*

#### **306-8.8.6 Fire Hydrant Installation.**

Fire hydrants shall be constructed in accordance with the City of Corona Standard Plans. The hydrant lateral shall be flushed through each fire hydrant with a City of Corona Fire Department Representative present to test for maximum fire flow capabilities. The Contractor shall notify the Fire Department 72 hours in advance of such test.

#### **306-8.9 Hydrostatic Pressure Test.**

*Delete entire heading and substitute with the following:*

#### **306-8.9 Hydrostatic Pressure Test and Flushing.**

### **306-8.9.2.2 Preparation.**

*Add the following after the first paragraph:*

Four-hour hydrostatic pressure test shall proceed prior to placing permanent surfacing, but after the following have occurred:

- a) Pipe appurtenances and permanent thrust blocks shall be installed and backfilled sufficiently to provide the required bearing area.
- b) Trench backfill involving compactive effort using heavy-duty compacting equipment weighing more than 100 pounds shall be completed.
- c) Thrust blocks and other field-placed concrete and mortar in contact with the pipe shall have been in place and allowed to cure for at least 7 days.
- d) Valves shall be verified by the Contractor to be bubble-tight and closed where available.
- e) Butterfly valves or other valves having a working pressure rating less than the test pressure shall be braced and blocked by the Contractor to provide a minimum back-pressure on these devices equal to the difference between the test pressure the valve or device's rated working pressure.
- f) Temporary bulkheads shall be placed in the pipe where valves are not available.
- g) Air test gauges shall be laboratory calibrated no more than one year prior to test.
- h) Contractor shall make arrangements to meter, pay for, deliver and dispose of test water.
- i) At least 24 hours before the test the pipeline shall be filled slowly with the air vents open and maintained at operating pressure for at least 24 hours to satisfy any system water absorption.
- j) Air shall be expelled from the pipeline to the best of the Contractor's ability.
- k) Bulkheads, valves, and connections shall be examined for leaks and corrective measures shall be taken to eliminate any leaks discovered.
- l) The Engineer shall be present to verify testing and record results.
- m) The Engineer shall be allowed to verify all intermediate valves are in the open position so "short-sheeting" cannot occur during pressure testing.

Test pressure shall be 200 psi as measured at the highest elevation of the water main under test.

*Delete the entire second, third and fourth paragraphs and add the following sections:*

#### **306-8.9.2.2.1 Initial Flushing.**

The Contractor shall flush all potable water mains and services with potable water to flush out debris prior to disinfection in accordance with the City provided flushing plan. Nonpotable water may be used for flushing of nonpotable water mains and services.

Provide fittings, connectors, manifolds, piping, hoses, and adapters as necessary to flush mains and services to achieve the required minimum flushing velocity over the entire length of the pipe as tabulated below.

PIPE DIAMETER	REQUIRED FLUSHING VELOCITY	REQUIRED FLUSHING FLOW	NUMBER OF SOURCE HYDRANTS REQUIRED	MINIMUM SIZE SUPPLY FITTING	MINIMUM SIZE SUPPLY HOSE OR PIPE	MINIMUM SIZE DRAIN FITTING	MINIMUM SIZE DRAIN HOSE OR PIPE
6-inch	5 FPS	440 gpm	1	4-inch	4-inch	4-inch	4-inch
8-inch	5 FPS	790 gpm	1	4-inch	4-inch	4-inch	4-inch
10-inch	5 FPS	1,223 gpm	1	6-inch	6-inch	6-inch	6-inch
12-inch	5 FPS	1,762 gpm	2	8-inch	6-inch	8-inch	8-inch
16-inch	3 FPS	1,870 gpm	2	8-inch	6-inch	8-inch	8-inch
20-inch	3 FPS	2,936 gpm	3	10-inch	6-inch	10-inch	10-inch
24-inch	2.5 FPS	3,523 gpm	3	12-inch	6-inch	12-inch	12-inch
30-inch	2.5 FPS	5,505 gpm	4	12-inch	6-inch	12-inch	12-inch

Remove fire hydrant head and install flanged tee at supply source for flushing all water mains larger than 8-inch diameter.

The backflow device and metered connection to the potable supply will be sized to meet this minimum flow requirement. Supporting calculations shall be submitted with the disinfection, testing, flushing and dechlorination plan. Velocities through outlets and fittings shall not exceed 25 feet per second (7.5 m/s) during flushing.

All pipelines shall be flushed for sufficient time to achieve 3 exchanges of the total volume of the pipeline as a minimum and until the flushing water exits the pipe in a clear condition having not more than 2 NTU turbidity as measured with a potable turbidity meter and not more than 0.5 mg/L suspended solids as measured in an eimhoff cone at all outlets.

Drainage facilities shall be constructed as necessary to ensure water lines do not become contaminated during flushing. The Contractor shall secure and adhere to the NPDES permit. If the Contractor is allowed to operate under the City's De Minimis Discharge permit, the Contractor will be charged for the hours necessary to supervise the preparation of lagoons, sampling, and laboratory analysis necessary to ensure compliance. The Contractor shall bear all direct and indirect costs.

Test or flushing water may be discharged to sanitary sewer system rather than discharging to storm drain, provided Contractor obtains and submits to Engineer a copy of written permission to discharge from sanitary sewer owner including supplementary information described above under Submittals. Schedule discharges to sewers during off-peak periods as recommended by sewer owner.

No entity or agent other than City of Corona DWP staff shall operate any valve or facility of the approved distribution system without the written consent and direct supervision of the DWP Chief Water Operator or designated representative.

Upon satisfactory test completion, permanently cap or plug any outlets used for flushing, testing or air release.

Unless otherwise specified, the Contractor shall make the arrangements for, and provide the water for, flushing and its subsequent discharge.

#### **306-8.9.2.4 Test Procedure.**

*Add the following after the second paragraph:*

The test pressure for sewage force mains and pressure sanitary sewers shall be 120% of the maximum working pressure shown on Plans unless the test pressure is specified elsewhere

in the Contract Documents.

*Add the following after the ninth paragraph:*

When leakage exceeds the amount allowed by the Specifications, the Contractor shall locate the leaks and make the necessary repairs or replacements in accordance with the Specifications to reduce the leakage or infiltration to the specified limits. Individual detectable leaks shall be repaired, regardless of the results of the tests.

#### **306-8.9.4 Disinfection.**

##### **306-8.9.4.1 General.**

*Add the following:*

Where the City's standard is more stringent than the associated AWWA standards, the City's standard shall supersede the AWWA standard.

Disinfection operations shall be scheduled by the Contractor as late as possible during the Contract time period to assure the maximum degree of sterility of the facilities at the time the Work is accepted by the City.

##### **306-8.9.4.2 Submittals.**

*Delete "If requested by the Engineer" from the first section of Table 306-8.9.4.2 under the "Description" column.*

##### **306-8.9.4.3 Potable Water System Disinfection Procedures.**

*Delete entire section and substitute with the following:*

All potable water pipelines except those appurtenant to hydraulic structures shall be disinfected in accordance with the requirements of AWWA C651 using the Continuous-Feed Method as modified herein. The Contractor shall provide sampling locations in accordance with AWWA C651, the California Department of Public Health Safe Drinking Water Systems regulations, and requirements herein along with Appendix E.

Preliminary and final flushing shall be performed on mains, which have been hydrostatically tested in accordance with the flushing plan.

Disinfection shall not be combined with any other activity such as pressure testing or flushing. Disinfection shall be against a capped or plugged line. The new main will be accepted as a whole and not in portions as they pass inspection. The only exception will be for very large projects where physical separations are used at predetermined locations and the procedures are clearly detailed in the pre-approval plan.

Contractor shall not allow chlorinated water to remain in contact with internal waterway ports of pumps, valves, and sensor line assemblies for longer than required to perform disinfection process.

All chemicals for chlorination and temporary valves, temporary blow-offs, bulkheads, backflow devices to prevent the strong chlorine solution in the line being disinfected from backflowing into the line supplying the water, or other necessary devices, chemicals or and materials shall be furnished by the Contractor. No materials shall be used which would be

injurious to the pipeline or its future function. Contractor shall keep adequate chlorine residual testing and indicating apparatus available on site during the entire disinfection period.

Unless otherwise indicated, potable water for testing and disinfecting water pipelines shall be furnished by the Contractor. Contractor shall also make all necessary arrangements for conveying the water to the points of use.

Chlorine for disinfection shall be in the form of sodium hypochlorite solution. The use of chlorine gas is not allowed. Sodium hypochlorite solution shall be used only:

- a) Under the direct supervision of an experienced technician;
- b) When all safety practices are observed.

Disinfection shall be accomplished by chlorination. Chlorinating and testing operations shall be performed in the presence of the City's Representative.

A chlorine-water mixture shall be uniformly introduced into the pipeline by means of a solution-feed chlorinating device. The chlorine solution shall be introduced at one end of the pipeline through a tap in such a manner that as the pipeline is filled with water, the dosage produced in all sections of the pipelines and appurtenances shall be not less than 50 mg/l nor more than 100 mg/l. Contractor shall make 24-hour chlorine residual tests and notify the Engineer of all chlorine test results.

Chlorinated water shall be retained in the pipeline for at least 24 hours. After the chlorine-treated water has been retained for the required time, the free chlorine residual at the pipeline extremities and at other representative points shall be at least 50 mg/l free chlorine. If the tests are not satisfactory, the Contractor shall provide additional disinfection as required until all tests are passed.

Placing of HTH capsules or powder in pipe sections during the laying process will not be considered adequate disinfection. The Contractor shall keep adequate chlorine residual testing and indicating apparatus available on site during the entire disinfection period. After final flushing, Contractor shall plug flushing fittings with devices intended for this purpose at pressure class of pipe. Where water main is coated for disinfection, plugs and outlets shall be similarly coated.

Contractor shall keep and provide accurate documentation of dosing rate (ppm), time of dosing and duration. Dosing agent's name, contact information and signature shall be provided.

Disinfection testing procedure shall be repeated if the initial tests fail to produce satisfactory results. Two consecutive satisfactory test results shall be required after any unsatisfactory test. The tablet method shall not be used for repeated disinfection.

During disinfection, all valves, hydrants, and other accessories shall be operated. All appurtenances shall be disinfected. Pipe and appurtenances used to connect the newly installed water main shall also be disinfected in accordance with AWWA C651.

#### **306-8.9.4.5 Dechlorination and Flushing.**

*Add the following after the first paragraph:*

Final Flushing shall be done by the Contractor after satisfactory chlorine residual test results have been returned and accepted by the Engineer.

Dechlorinate and remove pollutants from water flushed from water mains where discharging or draining to gutters, streets, storm drains, or any constructed or natural drainage channels (waters of the State) in accordance with AWWA C655 and NPDES Permit applicable for pipeline flushing.

Water flushed from water mains and spread on-site with no runoff does not require dechlorination.



Flushing water may be discharged to sanitary sewer system as alternative to discharging to storm drain, provided Contractor obtains and submits to City a copy of written permission to discharge from sanitary sewer owner including supplementary information described above under Submittals. Schedule discharges to sewers during off-peak periods as recommended by sewer owner.

After the applicable retention period, the heavily chlorinated water shall be flushed from the pipeline at its extremities until chlorine measurements show the concentration in the water leaving the pipeline is equal chemically and bacteriologically to those of permanent source of supply. A reducing agent shall be applied to the water to neutralize thoroughly the chlorine residual remaining in the water in accordance with AWWA C655 and the NPDES Permit applicable for the Water Quality Region in which the discharge occurs.

The following are parameters for flushing after disinfection:

- a) High chlorine concentration (super-chlorinated) water will be flushed completely from the main and discharged in compliance with the requirements of the NPDES general permit.
- b) The NPDES general discharge permit requires neutralization of the chlorine before it contacts the "waters of the State." How this will be achieved shall also be covered in the approved flushing and disinfection plan. A field test kit shall be used to adjust the neutralization. Samples shall be collected and analyzed by the colorimetric method to demonstrate the effectiveness of the neutralization.
- c) The NPDES general discharge permit (Table E-1) lists the discharge event parameters requiring monitoring for discharge of super-chlorinated water.
- d) The NPDES general discharge permit (Table E-2) requires one sample collected for discharge durations less than 20 minutes, and one sample during the first 10 minutes and a second sample within the last 10 minutes for flushing durations between 20 minutes and 60 minutes.
- e) All discharges must be  $<0.10\text{mg/L}$  Total  $\text{Cl}_2$  residual.
- f) Total chlorine residual will be measured in the source water. A field test kit that measures total and free chlorine and is approved for potable water reporting purposes shall be used. Pool kits are not acceptable. When the same total chlorine residual as measured in the source water is detected at all outlets and no free chlorine is present, then the flushing is complete.

#### 306-8.9.4.6 Bacteriological Sampling and Testing.

*Delete entire section and substitute with the following*

Provide not less than 5 business days advance notification to the City of all sampling activities to include proposed sampling location, description of sampling point, and name of firm or individual who will perform sampling. Provide sketch or plan showing the proposed sampling locations in accordance with AWWA C651, the California Department of Public Health Safe Drinking Water Systems regulations, and requirements herein. A City-provided flushing and disinfection plan may be used to meet this requirement to the extent the flushing and disinfection plans shows proposed sampling locations.

Sampling shall be accomplished by a qualified sampler employed by a certified laboratory. Laboratory certification shall be evidenced in the approved plan.

The qualified sampler employed by a certified laboratory shall collect a minimum of 2 sets of samples on consecutive days not less than 16 hours nor more than 24 hours apart after completion of final flushing. Deliver bacteriological samples to a certified laboratory for

bacteriological testing.

No flushing or any movement of water in the pipe is allowed during sampling phase.

Provide legible chain of custody documentation from point of sampling to laboratory for each sampling location. Do not comingle samples from different projects or different parts of the same project on the chain of custody or testing report.

Locations for water sampling for bacteriologic testing shall follow the requirements of AWWA C651, and shall be taken from each end of the disinfected main (located downstream of point of introduction of chlorine disinfectant), all branches of the new main and at intermediate points at intervals no greater than 300-feet. Sample points shall conform to those submitted in the approved disinfection plan. A second set of samples shall be collected from the same sample points not less than 16 hours nor more than 24 hours after the first set of samples were collected.

Temperature, total chlorine and free chlorine residuals shall be measured with a field test kit and recorded by the sampler on the "chain of custody" form. Both sample sets shall be analyzed for total and fecal coliform presence/absence and heterotrophic plate count. The Contractor may choose to request resample to verify or discredit laboratory results when one or two of many are unsatisfactory and a sampling error is suspected. The City of Corona reserves the right to sample for bacteria at its own discretion with notice.

Source water shall also be sampled two weeks prior to sampling and bacteriological testing, or the nearest water quality sample station's most recent results shall be used to determine the baseline water quality for the duration of the project. Source water sampling shall be under the supervision of the City's Water Production and Distribution Division staff.

Testing procedures shall follow the current edition of the Standard Methods for the Examination of Water and Wastewater. Satisfactory bacteriological results shall be as follows:

- a) No total or fecal coliform,
- b) heterotrophic plate count less than 500CFU and
- c)  $\text{Cl}_2$  residual shall be no less than 50 percent of the source water

Passing bacteriological tests on two consecutive days shall be achieved prior to placing the pipeline into service. In the event disinfection fails to produce satisfactory results in total or fecal coliform, the pipe shall be re-flushed, re-disinfected, resampled, and retested. In the event disinfection fails to produce satisfactory results in only heterotrophic plate count, the pipe may be re-flushed, resampled and retested one time at the City's discretion with City's written approval. If results from analysis of the second samples exceed the above criteria, the pipe shall be re-flushed, re-disinfected, resampled and retested until satisfactory results are obtained. All sampling and laboratory testing shall be at Contractor's expense. The Contractor shall be responsible for all repeat bacteriological testing costs.

### **306-8.9.5 Pipeline Commissioning.**

*Delete entire section and substitute with the following:*

Pipeline shall be placed into service as soon as practical and within seven (7) calendar days following receipt of passing bacteriological test results. Failure to place the pipeline into service within the time limit stipulated will require the Contractor to reflush, resample, and retest the pipeline at the Contractor's cost prior to placing pipeline into service. Provide not less than 3 business days advance notification to the City for all pipeline connections to enable City to provide engineering and field support. Connections shall be performed only on Tuesdays, Wednesdays, or Thursdays.

## **306-12 BACKFILL**

### **306-12.4 Jetted Trench Backfill**

#### **306-12.4.1 General.**

*Add the following:*

Jetting of backfill shall not be permitted for potable water main construction.